ChatGPT for shaping the future of dentistry: the potential of multi-modal large language model

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Abstract

The ChatGPT, a lite and conversational variant of Generative Pretrained Transformer 4 (GPT-4) developed by OpenAI, is one of the milestone Large Language Models (LLMs) with billions of parameters. LLMs have stirred up much interest among researchers and practitioners in their impressive skills in natural language processing tasks, which profoundly impact various fields. This paper mainly discusses the future applications of LLMs in dentistry. We introduce two primary LLM deployment methods in dentistry, including automated dental diagnosis and cross-modal dental diagnosis, and examine their potential applications. Especially, equipped with a cross-modal encoder, a single LLM can manage multi-source data and conduct advanced natural language reasoning to perform complex clinical operations. We also present cases to demonstrate the potential of a fully automatic Multi-Modal LLM AI system for dentistry clinical application. While LLMs offer significant potential benefits, the challenges, such as data privacy, data quality, and model bias, need further study. Overall, LLMs have the potential to revolutionize dental diagnosis and treatment, which indicates a promising avenue for clinical application and research in dentistry.